

State of Hawai'i
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawai'i 96813

May 26, 2017

Chairperson and Members
Board of Land and Natural Resources
State of Hawai'i
Honolulu, Hawai'i

Chairperson and Land Board Members:

SUBJECT: REQUEST TO EXTEND THE CLOSURE OF KAHUALE'A NATURAL AREA RESERVE, KAHUALE'A, PUNA, HAWAI'I ISLAND, TO THE PUBLIC, PURSUANT TO HAWAI'I ADMINISTRATIVE RULES § 13-209-4.5, FOR PUBLIC SAFETY PURPOSES, TAX MAP KEY: 1-2-008-001 AND TAX MAP KEY: 3-1-001-001 (PORTION).

This Board Submittal outlines the continuing status of volcanic hazards in Kahauale'a Natural Area Reserve (NAR), and requests the Board of Land and Natural Resources recommend extending the continued closure of the area for an additional two years, pursuant to Hawai'i Administrative Rules § 13-209-4.5.

BACKGROUND:

Kīlauea Volcano has been erupting continuously since January 1983. The Kahauale'a NAR has been inundated by lava flows several times during the 28+ year eruption of the middle east rift zone vents, namely Pu'u 'Ō'ō, Kupaianaha, and the Thanksgiving Eve Breakout (TEB) vents. The U.S. Geological Survey – Hawaiian Volcano Observatory (USGS-HVO) website provides updated status reports on the activity of Kīlauea.

Before the July 21, 2007 eruption, public use of Kahauale'a was steadily increasing. A hiking trail (known as the Captain's Trail, Kahauale'a Trail, or Pu'u 'Ō'ō Trail), developed over years of use, is widely publicized in visitor publications such as *Hawaii Revealed*, and encourages people to use the trail to illegally access Pu'u 'Ō'ō, the current eruption source. The northern slope of Pu'u 'Ō'ō is within the Kahauale'a NAR; with the majority of the vent within Hawai'i Volcanoes National Park (NPS). The NPS continues to restrict access to Pu'u 'Ō'ō. Over the years, in response to the number of rescues and incidents at Kahauale'a, NARS staff have partnered with the Hawai'i County Fire Department to increase signage and make minor trail improvements to minimize the number of hikers who become lost by going off-trail. A number of closure signs and fenced barriers have been placed across the trail.

Due to public safety concerns relating to unprepared visitors attempting to visit an active lava flow and an active volcanic area and the heightened risk of sulfur dioxide inhalation, and after

discussions with staff from USGS-HVO, the Board closed Kahauale‘a NAR to public access effective July 25, 2007. Since that time, NARS staff has communicated with USGS-HVO staff on a regular basis about the status and condition of the area to confirm that the area continues to pose a safety risk to visitors. In May 2008, a Memorandum of Understanding was approved between the Board and the USGS-HVO that allows USGS-HVO access to Kahauale‘a, for the purposes of volcanic hazard monitoring and provides the Board with hazard assessments and recommendations. Division staff regularly monitors the signage and barricade at the Captain’s Trail, and Division of Conservation and Resource Enforcement (DOCARE) officers patrol the area.

The Division requests that the Board recommend continued closure, following recommendation from the Natural Area Reserves System Commission, to continue the closure initiated July 25, 2007; returning to the NARSC and Land Board every two years to keep the entire Reserve closed due to volcanic hazards, and now to extend it for another two years, through July 24, 2019. Should conditions change during the next years so that public access can again be safely restored, the Division will return to the Board to re-open the NAR.

During the current closure, Special Use Permit Applications to conduct research, filming, cultural practices, and other uses have been considered on a case-by-case basis with restrictive conditions, as necessary, clearly defined, and these will be continue to be reviewed on a case-by-case basis over the next closure period. HVO also helps review permit requests.

Continued closure is supported by US Geological Survey (USGS) / Hawaiian Volcano Observatory (HVO); which still has concerns due to the close proximity of Pu‘u ‘Ō‘ō; that the NAR should remain closed due to extreme hazards from fumes and shifting eruption activities. While it may appear that there is little or no activity; that can change in an instant.

The area is ranked well above hazard levels for sulfur dioxide (hazard is 5 ppm; however, levels have been measured well above 150 ppm). HVO scientists and others charged with monitoring the entire area are prepared to deal with such situations with personal protective gear; but allowing the general public into such an already acknowledged area with not just potential for hazardous fumes, but shifting flows and lava tubes, is not prudent at this time. The vent areas and lava channels are hazardous and conditions can change rapidly including collapse of existing features. Lava flows advancing through vegetation can produce fire and methane explosions that propel chunks of lava and rock several feet in the air.

Because of previous volcanic activity in Kahauale‘a in the 1980’s and 1990’s, the entire NAR is marked by numerous old lave tubes and cracks, not partially covered by vegetation, making the holes and gaps difficult to see and extremely dangerous to anyone venturing off established trails.

While there are no current flows in to the NAR, there are breakouts in several areas of the flow field; the largest breakout is about 1.2 miles southeast of the vent. Smaller breakouts are present above and on the pali, and ocean entry at Kamokuna continues.

ANALYSIS:

Pursuant to Hawai'i Administrative Rule §13-209-4.5, the Board or its authorized representative, with the approval of the commission, may close or restrict the public use of all or any portion of a natural area reserve for up to two years, when deemed necessary by the commission for the protection of the natural, geological, or cultural resources of the area or the safety and welfare of persons or property, by the posting of appropriate signs indicating the duration, extent, and scope of closure. Closures may be renewed with the approval of the board or its authorized representative and the commission. All persons shall observe and abide by the officially posted signs designating closed areas. The proposed closure is requested for the safety and welfare of the public.

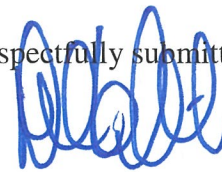
The Division is seeking approval to continue closure of the entire NAR, Tax Map Key 1-2-008-001, 16,293.11 acre, and Tax Map Key 3-1-001, 5,794.88 acre, Kahauale'a, Puna, Island of Hawai'i, Hawai'i.

The exact duration of the closure is currently uncertain, as it is entirely dependent on volcanic activity. The Division is concerned about posting a specific date on signage, based upon a belief that visitor publications will then publicize that date as a date upon which the NAR will be re-opened, building expectations and creating management problems if the closure needs to be extended. After further discussion with the Attorney General's Office and the Division of Conservation and Resources Enforcement (DOCARE), the Division has installed signage indicating that the area is *Closed until Further Notice*, or other appropriate language indicating the duration of the closure.

RECOMMENDATION:

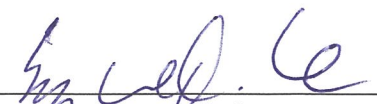
That the Board of Land and Natural Resources extend the closure of Kahauale'a Natural Area Reserve for an additional term of two years commencing from July 25, 2017 to July 24, 2019.

Respectfully submitted,



DAVID G. SMITH, Administrator

APPROVED FOR SUBMITTAL:



Suzanne D. Case, Chairperson

Attachment: USGS-HVO letter



United States Department of the Interior



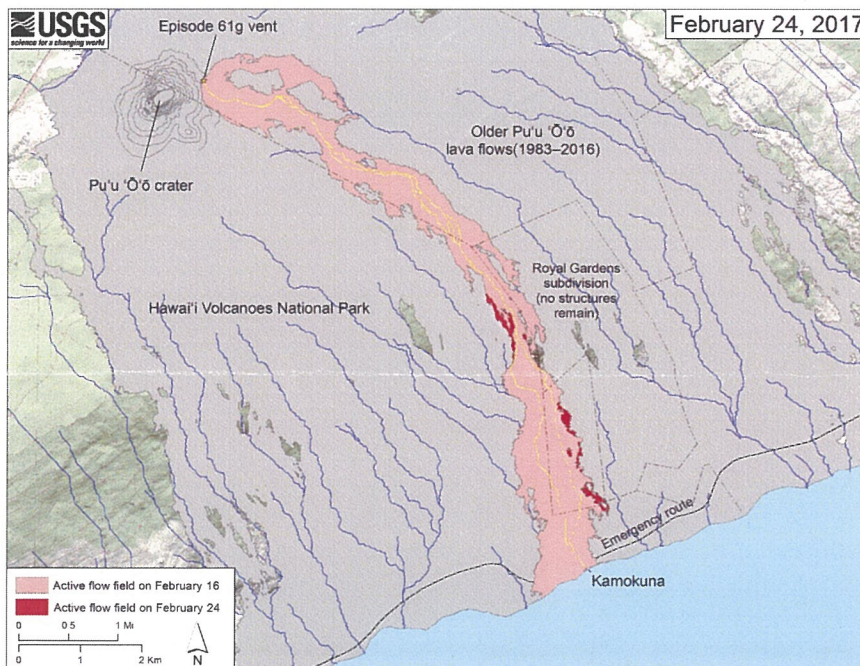
U.S. GEOLOGICAL SURVEY
Hawaiian Volcano Observatory
Post Office Box 51
Hawaii National Park, Hawai'i 96718-0051

IN REPLY REFER TO:

To: Betsy Gagne, Department of Land and Natural Resources
From: Christina Neal, Scientist-in-Charge
Date: March 10, 2017
Subject: Current Hazard Assessment of the Kahauale`a NAR

Due to ongoing eruptive activity at the Pu`u `O`o vent on Kilauea Volcano's East Rift Zone, several volcanic hazards persist in the Kahauale`a NAR. They include lava flows and volcanic gas, explosions, collapse of recently constructed topographic structures, and ground cracks.

Lava Flows: The NAR has been inundated by lava flows several times during the 34+ year eruption of the middle East Rift Zone. The entire southeastern arm of the NAR has been covered multiple times by `a`a and pāhoehoe flows. Currently, active lava flows from episode 61g at Pu`u `O`o are traveling via lava tube southeast through the NAR more or less parallel to the boundary with Hawai'i Volcanoes National Park. Occasionally, surface pāhoehoe lava flows are active following breakouts at the 61g vent on Pu`u `O`o's east flank and elsewhere along the tube system (Figure 1), including areas within the NAR. Until there is a significant shift in vent location, we expect this general style of activity to continue.



Lava flows from 1983-2016 in grey. Lava from episode 61g in pink. Red indicates surface flows active on February 24, 2017. The faint yellow line marks the trace of the 61g lava tube delivering lava to the Kamokuna ocean entry.



Gas Emissions: Pu‘u ‘Ō‘ō continues to emit elevated amounts of volcanic gases, the most noxious of which is sulfur dioxide (SO₂). These gas emissions, along with fine particles – collectively called vog – are most dangerous in areas near Pu‘u ‘Ō‘ō and skylights in the lava tube. Currently, SO₂ emissions from East Rift Zone vents are less than 500 metric tons per day. During previous episodes of activity along the East Rift Zone, however, emissions have been as high as 10,000 metric tons per day and this could happen again should the eruption style shift. Smoke from burning forest is also an issue intermittently, but less so as episode 61g lava heads across barren lava terrain.

During normal trade winds, Pu‘u ‘Ō‘ō and skylight emissions immediately depart the NAR and move to the southwest through Hawai‘i Volcanoes National Park. However, during kona or weak winds, these emissions can accumulate around Pu‘u ‘Ō‘ō and/or move out into the NAR; areas in close proximity to the sources will experience high concentrations of sulfur dioxide. An SO₂ sensor on the north rim of Pu‘u ‘Ō‘ō vent has recorded peak values of 150 ppm occasionally during kona wind conditions. The State of Hawaii Department of Health regards 15-minute-average sulfur dioxide concentrations above 1 ppm as Unhealthy and above 5 ppm as Hazardous.

Ground Cracks: The area north of the rift zone and the 1983-2016 flow field is mostly tube-fed pāhoehoe at least 400-500 years old. There are large cracks in this area often extremely well-hidden by vegetation. These are a significant hazard to anyone walking in the area.

Ground Collapse: The active vents of Pu‘u ‘Ō‘ō and numerous structures built by lava flows over the active lava tube system all pose significant potential of collapse and inundation by lava at any time.

Explosions: Active flows running through forests can generate dangerous blasts as trapped combustible gas (including methane), formed by lava-cooked vegetation, ignites and explodes. These are sudden, unpredictable, and can hurl blocks of lava into the air posing a significant hazard to those nearby. This hazard has diminished somewhat under current conditions but could recur at any time.

If you have any questions, please feel free to contact me at any time.



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